THE following are among recent appointments:—Dr. J. Franz, Assistant Professor of Astronomy at Königsberg, to be Director of the Breslau Observatory, and Professor of Astronomy in the University there; Dr. Frech to be full Professor of Geology in the University of Breslau; Dr. Carl Paal to be full Professor of Pharmaceutical and Applied Chemistry in the University of Erlangen; Dr. Paul Samassa to be Associate Professor of Zoology in the University of Heidelberg; Dr. Bredt, of Bonn, to be full Professor of Chemistry in the Polytechnic Institute at Aix; Dr. E. B. Copeland to be Assistant Professor of Botany in the University of Indiana; Mr. William George Hibbins, Whitworth Exhibitioner, and Research Scholar of the Mason College, Birmingham, to be additional Assistant in the Mechanical Engineering Department of the Merchant Venturers' Technical College, Bristol.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 3.—"The Sensitiveness of the Retina to Light and Colour." By Captain W. de W. Abney, C.B., D.C.L., F.R.S. Received May 10, 1897.

The author treats first of the extinction of the sensation of light on the centre of the retina. He made his reduction of the intensity of the light falling on the illuminated spot with a new piece of apparatus, which consisted of a gelatine wedge bent so as to make an annulus. He describes this wedge and its graduation, showing how its readings can be utilised, they being proportional to the logarithm of the intensity of light passing through it.

It is found that the smaller the spot of illuminated surface, the less reduction in intensity of the light is required, and that the amount of reduction of the light falling on the spot which just produces no sensation of light, is connected with the size of the spot by a simple formula, $I = x^m$, where I is the intensity and x the diameter of the spot. Further, he finds that it is the smallest diameter which governs the necessary reduction in intensity, and not the area of the illuminated surface. Having experimented with the extinction of light at other parts of the retina, he finds that it obeys the same law. Since a large and a small area having the same actual illumination appear to be of different brightness, an investigation was made of the relative luminosities of the two, and it was found that the two were connected by a very simple law.

The reduction of the intensity of a coloured ray to extinguish all colour was next measured with areas of different dimensions, and it was shown that again the intensity of the reduced light was connected with the size of the spot by a simple expression similar to that of the extinction of all light, but the exponential coefficient differed, indicating that light and colour were not connected together in the manner which might be expected.

The author then deals with the question of colour fields, and finds that all colour fields are of the same form, the extent depending solely on the illumination and the area of the surface the image of which fails on the retina. He finds that there is a connection between the intensity of the colour and the extent of the field which can be expressed by a formula, as also can the connection between the size of the spot of illuminated surface and the extent of field. He gives the curves of illumination for equal colour fields, and the curves of extent of field for every colour in the prismatic spectrum. Finally he makes an investigation into the relative sensitiveness to light of various points in the retina, and shows that there are "iso-lumes," or fields of equal sensitiveness, which appear to be of the same form as the colour fields.

He points out that there are difficulties in reconciling these results with either the Young or Hering theory of colour vision, and suggests a modification in the accepted theory of light and colour which may explain the connection between the two.

"On the Nature of the Contagium of Rinderpest." By Alexander Edington, M.B., F.R.S.E., Director Colonial Bacteriological Institute, Cape Colony.

In the following paper it is proposed to communicate to the Royal Society the results of experiments made in South Africa on the infectivity of the blood of animals affected with rinderpest. The experiments were all made on cattle kept under conditions in which accidental spontaneous infection could with certainty be excluded. These experiments had been concluded in 1896, before the arrival of Dr. R. Koch in South Africa, and their results had been communicated to him on his arrival.

(1) The blood of an animal ill with rinderpest, when taken during the febrile stage or previous to death, and injected subcutaneously or intravenously into healthy cattle, produces the typical disease—rinderpest, provided the blood is prevented from coagulating.

(2) The onset of coagulation and actual coagulation of the blood exerts a marked destructive influence on the virulence of such blood.

(3) The best method of obtaining virulent blood is to draw it aseptically from the jugular vein of an animal ill with rinderpest, and to mix it immediately with a 1 per cent. solution of citrate of potash, the latter previously well sterilised, in the proportion of 2-3 parts of blood to 1 part of citrate of potash solution. Such blood, as has been shown, remains fluid.

(4) This citrate of potash mixture of blood proves virulent in the first few days, generally not exceeding six days; after six days' keeping the virulence becomes rapidly weakened, so that after nine days the blood mixture is altogether inert.

(5) Admixture of glycerine to citrate blood does not *cæteris paribus* interfere with the virulence of such blood. Glycerine added to fresh blood does interfere with the virulence of the latter on account of the coagulation of the blood.

(6) The nasal mucus of an infected animal when used fresh and rubbed into the nostrils of normal cattle, produced in all instances typical rinderpest. We have never had a single failure in attempting to produce the disease by this means. By keeping the nasal mucus, even for a few hours, its virulence becomes markedly less.

(7) The condition of marked swelling of the lymphatic glands is one of, if not indeed the most evident pathognomic feature of the disease. The contagium exists as a primary infection in the lymphatic glands.

(8) A very mild attack of rinderpest, such as is produced by injection of blood of greatly decreased virulence, does not convey absolute immunity, this latter being produced in proportion to the severity of the attack through which the animal had passed primarily. An animal seemingly affected may have a relapse of the disease, which may go on to fatal issue or be mild in type, leading to recovery. Animals in the latter case always acquire immunity of a high degree.

Physical Society, June 11.—Mr. Shelford Bidwell, President, in the chair.—A mathematical paper was read by Mr. C. S. Whitehead, on the effect of sea-water on induction telegraphy. If a secondary circuit containing a telephone is rightly placed with respect to the field of a primary circuit traversed by an alternating current, signals may be transmitted over considerable distances. The author investigates the effect of filling the intervening space with sea-water; and, generally, the effect of a spherical conducting shell on the induction, at a point in a dielectric, due to an alternating current in a circular circuit, when the axis of the conductor passes through the centre of the shell. In the mathematical treatment, two cases are considered. (1) To find the normal magnetic induction at any point in the dielectric outside the shell when a circular circuit carrying an alternating current is placed in the dielectric inside a spherical conducting shell. (2) To find the normal magnetic induction at any point on the remote side of an infinite conducting plate, due to a circular circuit parallel to the plate. In both cases the following result is arrived at:

$$\frac{v_0}{u_0} = e^{-q\eta}$$

where v_0 is the maximum value of the normal magnetic induction at any point outside; w_0 the maximum normal magnetic induction due to the current in the primary, supposing the conducting shell or plate absent, at the same point; η the thickness of the shell or plate; and

$$q = \left(\frac{2\pi\mu p}{\sigma}\right)^{\frac{1}{2}}$$

where μ is the permeability of the conducting shell or plate; σ its specific resistance, $p = 2\pi$ times the frequency. If the frequency is 300, $p = 1885$. For sea-water, σ is taken as 2×10^{10} C.G.S. units; and $\mu = 1$. The sea-depth at the North Sand Head corresponds to $\eta = 2000$ cms. Hence, in this case, $\frac{v_0}{u_0} = \cdot 21$, or 79 per cent. is lost. Similarly, when

$\eta = 1000$, the loss is 54 per cent. The method employed in the investigation is that suggested by Lamb and Niven; the author adds an expression for Ω, the solid angle subtended by the circuit at any point, in terms of Bessel's functions. Mr. Evershed referred to some experiments of his own, from which he concluded that the author's formula gave too low an estimate of the attenuation; the discrepancy indicated that some term had been neglected. Mr. Yule doubted whether the equations given by the author were quite applicable to sea-water. There was need, apparently, of a term involving the polarisation of the medium. Mr. Heaviside communicated a criticism of the paper. It was not necessary to investigate the problem for any particular form of circuit from which the waves proceed. The attenuating factor for plane waves, due to Maxwell, was sufficient. Taking the best-known value for the conductivity of sea-water, there was no reason why the conductivity should interfere with signalling. A considerably greater conductivity must be proved for sea-water before it could be accepted that the failure of experiments on telegraphic communication with light-ships from the sea-bottom was due to that factor. It was unlikely theoretically; and Mr. Stevenson had contradicted it from a practical standpoint. For some reason, the account of the light-ship experiments had not been published, so that there was no means of finding the real cause of failure.—Mr. T. H. Blakesley read a paper on a new definition of focal length, and an instrument for determining it. The author asserts the principle that the focal length of a lens-combination is an abstract quantity, not necessarily the distance between two particular points. It is a quantity best defined in terms of some function of the two distances of object and image from their appropriate focal centres. Such a function is the magnification factor, m, the linear ratio of image to object, positive if the image is erect with regard to the object. Consider a particular pair of conjugate foci on the axis of a lens-system. Let one of these foci be at distance v from some fixed point on the axis, measured positively, in the direction of the rays. Then $\frac{dv}{dm}$ is constant, and is the focal length, f. If v_0 is the value of v when $m = 0$, $v - v_0 = f.m$. Let u be the position of the other focus, and u_0 its value when $m = \infty$. Then $u - u_0 = f.m^{-1}$; and $\frac{v - v_0}{u - u_0} = m^2$. The last expression, m^2, may be called the "areal magnification"; it is important in determining photographic exposure. The author describes an optical bank which enables $\frac{dv}{dm}$ to be measured by a very simple operation; it gives also a record, on a paper strip, of the magnification-factor corresponding to various relative positions of object and image. Dr. S. P. Thompson said the paper was the most important contribution to geometrical optics that had appeared for many years. The introduction of the magnification function was a most useful device leading to exceedingly simple results. The important thing to measure was not so much the focal length as the reciprocal of that quantity. Dr. Chree said the photographic method at present used at Kew for determinations of focal length gave greater security than any more direct method. The colour of the light had to be taken into account. Mr. Blakesley, in replying, called attention to the use of his strip diagrams of magnification, for enlarging purposes in photography. When the magnification along some definite line was known, the focussing-cloth might almost be dispensed with.—Dr. J. A. Fleming read a paper on a method of determining magnetic hysteresis loss in straight iron strips. The author's process is based upon the use of the bifilar reflecting watt-meter. The samples of iron, large or small, in the form of straight strips are inserted in a long solenoid. The solenoid is traversed by an alternating current, and the square-roots of the mean-square values of the current are determined by a Kelvin balance. A flat bobbin of fine wire may be slid along the strip; an electrostatic voltmeter connected to the ends of this exploring coil gives the square-roots of the mean-square values of the electromotive force in that coil. From these measurements and the known dimensions of the solenoid and coil, the induction density, B, can be found at any point of the length of the strip. From these results a curve is drawn, coordinating the values of B to corresponding distances along the half-length of the strip. Assuming the hysteresis loss per cycle, per c.c. of iron, to vary as the 1·6th power of the maximum induction density, and then raising all the B ordinates to the 1·6th power, and plotting a new curve over the first, another curve is obtained which represents the variation of hysteresis loss per c.c. of iron from point to point along the half-length of strip. Now, at some point along the half-length of strip there must be a section where the induction density is B, such that the true *mean* hysteresis loss for the *whole* bar is proportional to $B_1^{1\cdot6}$. Let this value of the induction density be called the "*effective value*," and the corresponding point in the strip the "*effective point*." Let $M{\cdot}B^{1\cdot6}$ stand for the mean ordinate of the curve representing the varying values of $B^{1\cdot6}$ all along the half-length. Then, evidently,

$$B_1 = \sqrt[1\cdot6]{M \cdot B^{1\cdot6}}$$

The following curious experimental result is found. Whatever may be the length or section of the iron strip, the point at which the actual induction density has a value equal to the "effective" value, always comes at the same proportional distance from the centre of the strip. This distance is very exactly equal to 0·56 of the half-length, as measured from the middle; or 0·22 of the whole length from one end. If, therefore, the secondary coil is placed at that spot, and the secondary voltage then observed is used to calculate the induction density, the value so obtained corresponds to the true mean value of the varying hysteresis loss per c.c. all along the strip. Mr. Carter asked whether roots other than the 1·6th gave a similar constant value of the induction density. Dr. Fleming said it seemed to be the result of accident that the 1·6th root gave a constant value for iron.—The President proposed a vote of thanks to the authors, and the meeting adjourned until June 25.

Geological Society, May 26.—Dr. Henry Hicks, F.R.S., President, in the chair.—On augite-diorites with micropegmatite in Southern India, by Thomas H. Holland, Officiating Superintendent, Geological Survey of India. This paper dealt with a series of basic dykes intersecting the pyroxene-granulites and gneisses of the Madras Presidency, and believed to be of the same age as the lava-flows of the Cuddipah system. These dykes consist essentially of augite (near hedenbergite) and a plagioclase-felspar (near labradorite), between which we find masses of micropegmatitic intergrowths of felspar and quartz, with a micro-miarolitic structure. Around the patches of micropegmatite, chemical changes have frequently taken place in the minerals of the rock. After discussing the chemical constitution of the rock, and of its various constituents, and the relation between the micropegmatite and the surrounding minerals, the author pointed out that three methods for the formation of the micropegmatite may be conceived of: (α) during the primary consolidation of the magma; (β) by secondary changes induced in the rock; (γ) by subsequent intrusion of granophyric material into the augite-plagioclase rock. In opposition to (γ), the author pointed out the entire absence of granitic intrusions in the neighbourhood. He regarded the absence of all proofs of subaerial hydration, and the remarkable freshness of the rocks as precluding the possibility of the micropegmatite having been formed by secondary change. The primary origin of the micropegmatite he believed to be proved by (1) the crystallographic continuity of its felspar with that of the normal plagioclase of the rock; (2) the mode of occurrence of the micropegmatite, filling in the angles and spaces between the augite and the plagioclase; and (3) its variation in coarseness of grain agreeing with that of the remaining two constituents of the rock. An interesting discussion took place upon the question of the primary or secondary origin of the micropegmatite in basic rocks.—The laccolites of Cutch and their relations to the other igneous masses of the district, by the Rev. J. F. Blake. The author has observed thirty-two domes of various kinds in Cutch, distributed as follows: (i.) those connected with the northern islands; (ii.) those of Wagir; and (iii.) those along the northern edge of the mainland. They are divisible into four classes: (*a*) those which are so elongated on the line joining adjacent ones that they seem to be mere modifications of anticlinals, though the supposed anticline is not really continuous; (*b*) those which lie in a line, but are not elongated in that direction, and often in no other; (*c*) those which are related to a fault, which cuts them in half; and (*d*) those which are not in any particular relation to each other, or to any other stratigraphical feature. The domes varied in degree of perfection: some were irregular, while some had the strata running in concentric circles, the outer and newer strata dipping away from the inner and older. In no less than ten of the thirty-two domes igneous bosses were found occupying the centre, and these were distributed amongst all of the above classes. The author gave reasons for maintaining that the domes were the results of intrusion of igneous rocks in the form of laccolites, and were not anticlinal folds which have afterwards been affected by cross-folds. The domes were contrasted with igneous peaks which occurred in abundance in a different part of the area, usually at a higher horizon of the strata and at a higher level above sea. These were probably volcanic pipes through which the lava was forced and extruded at the surface. The author compared the rocks of the bosses with those of the dykes and flows. Both were principally perfectly fresh dolerites, but the former were distinguished by the presence of intergrowths of micropegmatite as the last stage of consolidation, as in the "Konga diabases." There was also among them a felsite-breccia with micropegmatite developed in the cracks. He considered that nearly all the igneous rocks of Cutch had been derived from a single magma, which in a solid condition must have contained large crystals of augite, olivine, and ilmenite in a ground-mass of lime-felspars, and have been throughout of a basic character. Such a magma originated in more than one centre.

Zoological Society, June 1.—Dr. Albert Günther, F.R.S., Vice-President, in the chair.—A communication was read from Dr. John Anderson, F.R.S., containing a water-colour drawing of the Egyptian weasel (*Mustela subpalmata*), taken from living specimens which he had recently presented to the Society's menagerie. Dr. Anderson also sent some remarks on this rare Egyptian mammal, and others were made by Mr. E. C. Taylor. —A communication was read from Prof. T. W. Bridge, on the morphology of the skull in the Paraguayan Lepidosiren and other Dipnoi.—A paper on the classification of the *Thyrididæ*, a family of the Lepidoptera Phalænæ, by Sir George F. Hampson, Bart., was read. It contained short diagnoses of the twenty-six known genera (of which *Pycnosoma* and *Plagiosella* were described as new) of the group, and a list of the known species of each genus.—A second communication from Sir George Hampson treated of the classification of the *Chrysauginæ*, a subfamily of moths of the family *Pyralidæ*. Like the preceding paper, it contained diagnoses of the known genera, of which seventy-six were enumerated, and a list of the known species of each genus. Of the genera the following were characterised as new:—*Hyalosticta*, *Protrichia*, *Prionidia*, *Microzancla*, *Sarcistis*, *Monoloxis*, *Dilaxis*, *Tetraschistis*, and *Cyclopalpia*.—Dr. A. G Butler read a paper on a collection of Lepidoptera obtained in East Africa in 1894 by Mr. F. Gillett. Fifty-seven species were enumerated, and the dates of the capture of the specimens were recorded.—Dr. C. I. Forsyth Major read a paper on the Malagasy genus of rodents *Brachyuromys*, and entered into the question of the mutual relation of some of the groups of the *Muridæ* (*Hesperomyinæ*, *Microtinæ*, *Murinæ*, and *Spalacidæ*) with each other and with the *Nesomyinæ* of Madagascar. The Malagasy Rodentia were considered as forming a subfamily *Nesomyinæ*, the lowest of *Muridæ*, being forerunners of the American *Hesperomyinæ*, the Old-World *Murinæ* and the *Microtinæ* (*Arvicolinæ*). One of the genera from Madagascar (*Brachyuromys*) was stated to bear close affinities to a genus of the *Spalacidæ*. Reasons were given for regarding the last-named family as only lowly-organised *Muridæ*.

CAMBRIDGE.

Philosophical Society, May 10.—Prof. Liveing, Vice-President, in the chair.—Observations on stomata by a new method, by Mr. Francis Darwin, President. The method consists in the use of "Chinese sensitive leaf," *i.e.* thin sheets of horn treated in a special manner. When a strip of this substance is placed on the stomatal surface of a leaf, it gives evidence of the condition of the stomata by its movement. If they are open, it curves away from the source of moisture; if shut, it remains stationary. By means of a simple apparatus the degree of curvature of the horn is recorded. All the ordinary experiments with stomata can be easily and rapidly shown with a hygroscope of this sort. By taking readings at regular intervals the diurnal course of the stomata can be studied; in this way it has been shown that the nocturnal closure of the stomata is a periodic phenomenon like the "sleep" of leaves. A number of observations were made on the effects of the withering of leaves on the stomata: it was shown that while the stomata of certain species simply close as the leaf withers, in others the first effect is a well-marked opening. This fact is of interest in connection with the mechanism of the stomata, since it indicates the share which the pressure of the surrounding epidermic cells has on the guard cells. It was shown that many plants open their stomata in long-continued darkness; this fact bears on the mode of action of the guard cells, since it shows that they do not (as is often assumed) lose their turgescence when the assimilation of CO_2 is prevented.—Notes on hybrid Cinerarias produced by Mr. Lynch and Miss Pertz, by Mr. Bateson. It is stated by many writers that the garden Cineraria arose as the hybrid offspring of several species of *Senecio* from the Canary Islands. This statement has been questioned by Mr. Thiselton Dyer on various grounds. The author exhibited hybrids raised from *S. cruentus*, *S. multiflorus*, and *S. Heritieri* (= *lanatus*) raised in the Cambridge Botanic Gardens by Mr. Lynch and Miss Pertz, which illustrated the very great variability which appears in the offspring of the various crosses. In particular, specimens of *Heritieri* ♀ × *cruentus* ♂ and of the reciprocal cross were produced, showing excessive variability and proving how greatly the peculiar characters of *Heritieri* may be obscured in the offspring, even of the first cross. Five specimens of *multiflorus* ♀ × *Heritieri* ♂ were exhibited, each of which was exceedingly distinct from the rest. Experiments had entirely confirmed Darwin's observation that Cinerarias are self-sterile in a high degree. They hybridise, on the contrary, with great readiness. An accidental hybrid between *Heritieri* ♀ × garden Cineraria ♂ and the reciprocal were also shown, the two plants being quite unlike each other. One seedling *multiflorus* ♀ × garden Cineraria ♂ had been produced which was almost entirely female, a few anthers only appearing in later inflorescences. These experiments were to be continued; but so far as they had gone, they were entirely consistent with the view that the Cineraria was a hybrid between several species, *cruentus*, *Heritieri* and, probably, *multiflorus* being among them. The two first are named by most writers as probable parents.

PARIS.

Academy of Sciences, June 8.—M. A. Chatin in the chair.—On the periods of double integrals, and the development of the disturbance function, by M. H. Poincaré.—General theory of gradually varied conditions in the friction of liquids with vortices; formulæ of the first approximation, by M. J. Boussinesq.—Action of light upon mixtures of chlorine and hydrogen, by MM. Armand Gautier and H. Hélier. The influence of moisture upon the combination of the two gases under the action of light was first studied. When water is present the velocity with which hydrochloric acid is formed is considerably increased, this effect being probably produced by the lowering of the partial pressure of the hydrogen chloride formed. The effect produced by exposure for different periods to standard artificial light was also studied. If either gas is in excess, the reaction is much accelerated.—Observations on the limitation of chemical reactions, with especial regard to the preceding communication, by M. Berthelot.—Reply of M. Armand Gautier to M. Berthelot.—Note by M. Berthelot accompanying the presentation of his work on "Thermochimie." —A new truffle (*Terfezi aphroditis*) from the Isle of Cyprus, by M. Ad. Chatin. This truffle is characterised by its dark colour, being known locally as the black truffle. It frequently attains a very large size, one weighing 385 grams having been found in 1873.—Micrometric measures of double stars made at St. Petersburg and Domkino by Prof. S. de Glasenapp, Director of the Imperial University of St. Petersburg, by M. Loewy.—Examination of some spectra, by M. Lecoq de Boisbaudran. A reply to some criticisms of Eda and Valenta.—A Committee was appointed to present a list of candidates for the Foreign Associateship, rendered vacant by the death of M. Tchébychef. —Theoretical and practical study of the lung, its functions and diseases. Tuberculosis and its clinical cure, by M. H. Grasset. —On surfaces having the same spherical representation, by M. A. Pellet.—Remarks on a recent note of J. M. Weber, by M. E. Goursat.—On real systems of complex numbers, by M. E. Cartan. —Properties of the simple kathodic rays. Relations with simple electric oscillations, by M. H. Deslandres. An electrified body, interposed in the path of a kathode ray, causes an enlargement of the shadow, the kathode bundle being divided up into several distinct and unequally deviated bundles. These bundles are called simple kathodic rays, and it is shown that they correspond to simple electric oscillations.—On the atomic weight of cerium, by MM. Wyrouboff and A. Verneuil. Having shown in a preceding paper that it is possible to prepare cerium oxide in a state of high purity, this specimen has been utilised to fix the atomic weight of the metal. The sulphate was carefully purified from free sulphuric acid by repeated precipitation with alcohol or by careful ignition, and the atomic weight determined by three methods, namely, from the loss of water of the hydrated sulphate at 250° (92·70), from the ratio C_3O_4 : hydrated salt (92·83), and from the ratio C_3O_4 : dry salt (92·87), the mean result being about 92·7.—On the heat disengaged by the addition of bromine to some unsaturated substances, by MM. W. Louguinine and Iv. Kablukov. The unsaturated substances, for which results are given, include allyl chloride, ethyl allyl ether, allyl acetate, crotonic aldehyde, mesityl oxide and cinnamic alcohol.—Combinations of phenylhydrazine with metallic bromides, by M. J. Moitessier. Compounds of phenylhydrazine with the bromides of zinc, cadmium and magnesium are described.—On a menthoglycol, by MM. Ph. Barbier and G. Leser.—Chemical study on the culture of *Cattleya*, by MM. Alex. Hébert and G. Truffaut.—The use of aluminium vessels, by M. Balland. A method of treatment is described which permits of the rapid examination of aluminium water-flasks and other vessels used for military purposes.—The bacteria of boghead cannel, by M. B. Renault. The presence in boghead coal of an extremely small micrococcus is proved, to the chief of which the name *Micrococcus petrolei* is given.—Study of the infectious lesions of the bubonic plague, by M. Gustave Nepveu.—Researches on the Ostioles, by M. J. J. Andeer.—On the mechanical impossibility of the geometry of Lobatschewsky, by M. Jules Andrade.

DIARY OF SOCIETIES.

THURSDAY, JUNE 17.

ROYAL SOCIETY, at 4.30.—An Experimental Research upon Cerebro-Cortical Afferent and Efferent Tracts: Prof. Ferrier, F.R.S., and Dr. Turner.—On the Relative Behaviour of the H and K Lines of the Spectrum of Calcium: Dr. and Mrs. Huggins.—(1) Further Observations of Enhanced Lines. (2) The Total Solar Eclipse of August 9, 1896. Report on the Expedition to Kiö Island. (3) On the Classification of the Stars of the δ Cephei Class: J. Norman Lockyer, F.R.S.—On the Action exerted by certain Metals and other Substances on a Photographic Plate: Dr. W. J. Russell, F.R.S.—Stress and other Effects produced in Resin and in a Viscid Compound of Resin and Oil by Electrification: J. W. Swan, F.R.S.—On Lunar and Solar Periodicities of Earthquakes: Prof. A. Schuster, F.R.S.—Kathode Rays and some Analogous Rays: Prof. S. P. Thompson, F.R.S.—And other Papers.

LINNEAN SOCIETY, at 8.—On the Distribution of *Primula elatior*, Jacq.: Miller Christy.—On the Acari collected by Mr. H. Fisher, Naturalist of the Jackson-Harmsworth Polar Expedition, at Cape Flora, Northbrook Island, Franz-Josef Archipelago, in 1896: A. D. Michael.—Further Observations on Stipules: Sir John Lubbock, Bart., F.R.S.—On Minor Tension Lines between Plant Formations: Prof. Conway Macmillan.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—The Reduction of Perthiocyanic Acid: F. D. Chattaway and H. P. Stevens.—Molecular Refraction of Dissolved Salts and Acids, Part II.: Dr. J. H. Gladstone, F.R.S., and W. Hibbert.—On a Space Formula for Benzene: Prof. J. Norman Collie, F.R.S.—On the Production of some Nitro- and Amido-oxypicolines: Dr. A. Lapworth and Prof. J. Norman Collie, F.R.S.—The so-called Hydrates of Iso-propyl Alcohol; Dr. T. E. Thorpe, F.R.S.—The Carbohydrates of the Cereal Straws: C. F. Cross, E. J. Bevan, and C. Smith.—Further Experiments on the Absorption of Moisture by Deliquescent Substances: H. Wilson Hake.

MINERALOGICAL SOCIETY, at 8.—On Blödite from the Punjab: F. R. Mallet.—On Monazite and Xenolime in European Rocks: Orville A. Derby.—On the Identity of Sundtite and Webnerite: G. T. Prior and L. J. Spencer.

FRIDAY, JUNE 18.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Sub-Oceanic Changes: Prof. John Milne, F.R.S.

SATURDAY, JUNE 19.

GEOLOGISTS' ASSOCIATION—Excursion to Leighton Buzzard. Director: A. C. G. Cameron. Leave Euston, 9.10 a.m.; arrive Leighton, 10.47 a.m.

MONDAY, JUNE 21.

VICTORIA INSTITUTE, at 4.30.

TUESDAY, JUNE 22.

ROYAL STATISTICAL SOCIETY, at 5.—Annual General Meeting.

WEDNESDAY, JUNE 23.

GEOLOGICAL SOCIETY, at 8.

FRIDAY, JUNE 25.

PHYSICAL SOCIETY, at 5.—A New Theory of the Earth's Magnetism; Mr. Sutherland.—Experiments in Critical Phenomena; Dr. Kuenen.—On the Attenuation of Electric Waves in Wires: Dr. Barton.—On the Steady Motion of an Electrified Ellipsoid: G. F. C. Searle.

SATURDAY, JUNE 26.

GEOLOGISTS' ASSOCIATION.—Excursion to Red Hill and Merstham (New Railway). Directors: Dr. G. J. Hinde, F.R.S., and W. Whitaker, F.R.S. Leave Cannon Street Station (S.E.R.) at 1.35 p.m.; arrive at Red Hill, 2.21 p.m.

LONDON GEOLOGICAL FIELD CLASS.—Excursion—Aylesford to Maidstone. Lower Greensand. Leave Cannon Street, 2.37; arrive Aylesford, 4.9.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—In Garden, Orchard and Spinney, Phil Robinson (Isbister).—The Dolmens of Ireland: W. C. Borlase, 3 Vols. (Chapman).—The Woodland Life: E. Thomas (Blackwood).—The Collected Mathematical Papers of Arthur Cayley, Vol. xii. (Cambridge University Press).—Électro-Métallurgie: A. Minet (Paris, Gauthier-Villars).—Grundprobleme der Naturwissenschaft: Dr. A. Wagner (Berlin, Gebrüder Borntraeger).—Introduction to Philosophy: Prof. O. Külpe, translated by W. B. Pillsbury and E. B. Titchener (Sonnenschein).—The Fertility of the Land: Prof. I. P. Roberts (Macmillan).—Human Embryology: Prof. C. S. Minot (Macmillan).—The Psychology of the Emotions: Prof. Th. Ribot (Scott).—Grundriss der Entwickelungsmechanik: W. Haacke (Leipzig, Georgi).—Nouvelle Étude sur les Tempêtes, &c.: H. Faye (Paris, Gauthier-Villars).—Life in Early Britain: Prof. B. C. A. Windle (Nutt).

PAMPHLETS.—L'Ora Esatta Dappertutto: Dr. M. Rajna (Milano, Hoepli).—On the Origin of the European Fauna: Dr. R. F. Scharff (Dublin, Ponsonby).—Epistolæ quas per Annos a 1596 ad 1601: Tycho Brahe et Oligerus Rosenkrantzius (Havniae).

SERIALS.—Proceedings of the Physical Society of London, June (Taylor).—Geographical Journal, June (Stanford).—Journal of the Asiatic Society of Bengal, Vol. lxv. Part 2, Nos. 3 and 4; and Part 3, No. 1 (Calcutta).—American Journal of Science, June (New Haven).—Abhandlungen zur Physiologie der Gesichtsempfindungen aus dem Physiologischen Institut zu Freiburg i. B., Erstes Heft (Hamburg, Voss).—Aeronautical Journal, 1897. No. 3 (Boston, Clarke).—Atti della Fondazione Scientifica Cagnola della sua Istituzione in Poi, Vol. xiv. (Milano).—Memoire del R. Istituto Lombardo di Scienze e Lettere, Vol. xx., xi. sella, serie iii. Fasc. 1–4 (Milano, Hoepli).—Journal of the Chemical Society, June (Gurney).—Bulletin of the American Mathematical Society, May (New York, Macmillan).—Himmel und Erde, June (Berlin, Paetel).—Journal of the Franklin Institute, June (Philadelphia).—American Naturalist, June (Philadelphia).—Transactions of the American Microscopical Society, Vol. xviii. (Buffalo, Brown).—McClure's Magazine, June (New York, McClure).

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